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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,665	10/24/2003	Nitin Muppalaneni	5693P027	9957

48102   7590   06/09/2006

NETWORK APPLIANCE/BLAKELY
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EXAMINER
DOAN, DUC T

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

<table>
<tr>
<td rowspan="2" style="text-align:center; vertical-align:middle;"><i>Office Action Summary</i></td>
<td colspan="2">Application No.

10/692,665</td>
<td colspan="2">Applicant(s)

MUPPALANENI ET AL.</td>
</tr>
<tr>
<td colspan="2">Examiner

Duc T. Doan</td>
<td>Art Unit

2188</td>
<td></td>
</tr>
</table>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>14 November 2005</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-35</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-35</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-35 are in the application.

Claims 1-35 are rejected.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in

section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the

manner in which the invention was made.

Claims 1-3,8-10,13-14,18-2124-30,32,34-35 rejected under 35 U.S.C. 103(a) as being

unpatentable over Dekoning (US 6691245) and in view of Strange et al (US 2003/0084242).

As in claim 1, Dekoning describes a method for mirroring data on a first storage server

and a second storage server (Fig 1: #106 local host, #109 remote host), the method comprising:

queuing write commands at the first storage server between consistency points, the write

commands being to write data corresponding to a file system of the first storage server to a local

mass storage device coupled to the first storage server (Dekoning's column 7 line 60 to column 8

line 11 suggests all subsequent new writes will be queued up and forward to the remote storage

device for mirrored storage updating at synchronization time),

at a start of each consistency point, sending the write commands to the local mass

storage device and to a remote mass storage device coupled to the second storage server

(Dekoning's column 7 lines 7 to column 8 lines 18; write procedures to local storages devices

lead to synchronization of the remote storage devices, new written data are forwarded to remote

storage device); updating memory blocks of the local and remote mass storage devices based on

the write commands (Dekoning's column 8 lines 45-65, synchronizing by sending new data to

remote storage device and steps to synchronizing cache, local storage and remote storage;

Dekoning's column 10 lines 15-25),

and at an end of each consistency point constructing a representation to reference each memory

block of the local mass storage device that is in use to represent the file system; and sending at

least a portion of the representation to the second storage server. Dekoning does not describe the

claim's aspect of sending a representation of the file system to the second storage server.

However, Strange describes a synchronization method that have a mirrored file system in which

data in both plexes are represented using a hierarchical of nodes (Fig 5, Fig 3B, each flex

represents a full copy of the file system, paragraph 48). The snapshot data in the file system can

be located and be synchronized easily by referring to a root node generated for each snapshot

(Strange's paragraph 34-35). The changed portion of this hierarchical nodes will be used during

resynchronization of mirroring plexes (Strange's paragraphs 67-69). It would have been obvious

to one of ordinary skill in the art at the time of invention to include snapshot structures and

procedures as suggested by Strange in Dekoning's system to quickly locate the data

corresponding to a particular snapshot for mirroring storages, thereby the complexity of resynchronization step is reduced (Strange's pages 4-5 parargaphs 58,69).

As in claim 2, the claim recites wherein the memory blocks of the local and remote mass storage devices comprise address blocks that store a pointer to another block in use by the file system, and data blocks that store data for the file system (Strange's Fig 2D inode blocks used as pointers and data blocks).

As in claim 3, the claim recites wherein each representation constructed at the end of a consistency point is organized as a sub-tree structure comprising nodes that represent one of the address blocks and the data blocks. Claim 3 rejected based on the same rationale as in claim 2. (Fig 2D, Fig 5).

Claim 8 rejected based on the same rationale as in the rejection of claim 1. Strange's paragraphs 5,46, Fig 5 further describes a storage manager capable of translating high level write command, for example write command of NAS or of RAID devices into block write commands for local and remote storage devices.

As in claim 14, the claim recites wherein the receiving and the updating is performed once at each consistency point (Dekoning's column 7 line 57 to column 8 line 12).

Claims 9,18,20,29 rejected based on the same rationale as in the rejection of claim 2.

Claims 10,21 rejected based on the same rationale as in the rejection of claim 3.

Claims 13,19,24,34,35 rejected based on the same rationale as in the rejection of claim 1.

Claim 25 rejected based on the same rationale as in the rejection of claim 14.

Claim 26 rejected based on the same rationale as in the rejection of claim 15.

Claim 27 rejected based on the same rationale as in the rejection of claim 6.

Claim 28 rejected based on the same rationale as in the rejection of claim 17.

Claim 30 rejected based on the same rationale as in the rejection of claim 8.

Claim 32 rejected based on the same rationale as in the rejection of claims 7,8.

Claims 4-7,11-12,15-17,22-23,31,33 rejected under 35 U.S.C. 103(a) as being

unpatentable over Dekoning (US 6691245), Strange et al (US 2003/0084242) as applied to claim

3,10,14,21,8,32 and further in view of Guthrie (US 2005/0010592).

As in claims 4-5, the claims recite wherein each sub-tree is rooted in a root node that

includes a pointer to each sub-tree structure (claim 4); wherein sending at least a portion of the

representation comprises sending the root node to the second storage server (claim 5). Dekoning

and Strange do not explicitly describe the claim's detail of the root node sub-tree. However,

Guthrie describes a method of creating multiple snapshots of data in a file system in which

whenever a new snapshot is created, the snapshot copies the current root node of the data to a

new root node (Guthrie's paragraph 17), and the root nodes of all snapshots are linked into list

(Guthrie's paragraph 33). It would have been obvious to one of ordinary skill in the art at the

time of invention to include method of linking snapshot data structures as suggested by Guthrie

in Dekoning's system thereby different snapshots can be added or deleted easily by traverse the

root node (Guthrie's paragraphs 33-35).

As in claim 6, the claim recites wherein updating the memory block is in accordance with

a scheme in which a memory block referenced within a representation is not overwritten

(Strange's paragraph 36, write command only to an unused block).

As in claim 7 the claim recites allowing read-only access to the remote mass storage device while updating the memory blocks of the remote mass storage server (Dekoning's column 7 line 55 to column 8 line 13 teaches that using the snapshot repository #146, the data at remote storages and at the checkpoint are available for read access).

Claims 11,22,31,33 rejected based on the same rationale as in the rejection of claim 4.

Claims 12,23 rejected based on the same rationale as in the rejection of claim 5.

As in claims 15,17, the claims recite further comprising receiving at the end of each consistency point, a representation of each memory block currently in use to represent an active state of the file system (claim 15); wherein the representation comprises a root node for a tree data structure that includes nodes representing the memory blocks currently in use by the file system (claim 17). The claims rejected based on the same rationale as in the rejection of claims 1,4-5.

Claim 16 rejected based on the same rationale as in the rejection of claim 6.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Watanabe US 6745303.

Doucette et al US 2002/0194529.

Viswanathan et al US 2004/0153736.

Doucette et al US 6636879.

When responding to the office action, Applicant is advised to provide the examiner with

the line numbers and page numbers in the application and/or references cited to assist examiner

to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The

examiner can normally be reached on M-F 8:00 AM 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DD

Mano Padmanabhan

Supervisory Patent Examiner

TC2188